Risk-Based Clean Closure
Region III RCRA Clarification
August 21, 1998

As part of EPA's ongoing efforts to improve program coordination and provide consistent goals, on March 16, 1998 EPA Headquarters issued a final memorandum titled Risk-Based Clean Closure. This memorandum bridges the differences in remediation standards required for the clean-up of releases from regulated units going through the RCRA clean closure process and the clean-up of releases from non-regulated units under other remedial programs such as the RCRA Corrective Action Program.

Closure is the term used to describe the actions taken when a RCRA regulated unit is removed from service. Since 1982, when the closure regulations were promulgated, two types of closure have been recognized: "clean closure," which means that all hazardous waste, liners and environmental media contaminated by releases from the unit have been removed or decontaminated; and "closure with waste in place" often referred to as "landfill closure" which requires the facility to obtain a post closure permit, dictating long-term monitoring and post-closure care among other things.

In 1985 and in 1987, EPA promulgated regulations to clarify closure requirements. The Risk-Based Clean Closure memorandum provides additional guidance on EPA's interpretation of clean closure, specifically with respect to the amount of residual contamination which may remain in an environmental medium, while still meeting the clean closure standards. With regard to residual contamination, the memorandum clarifies three aspects of the clean closure regulations: 1) it reaffirms that clean closure standards can be based on risk; 2) it specifies the situations where fate and transport modeling is acceptable; and 3) it establishes EPA's new policy to allow for use of non-residential exposure scenarios for contaminated media in certain, limited circumstances. EPA Region III is referring to this third type of closure as "restricted-use clean closure."

States have requested the Region to provide further clarification on the final March 16, 1998 memorandum guidance, especially with respect to clean closure using non-residential scenarios. In response to this request, Region III is providing further explanation regarding appropriate application and necessary considerations when utilizing a non-residential exposure scenario to achieve clean closure. While the explanation below applies strictly to Region III states, it was written with input from EPA's Headquarters Office to assure that the interpretation is consistent with the Agency's objectives.

The premise of clean closure is that all hazardous wastes have been removed from a given RCRA regulated unit and that any releases at or from the unit have been remediated so that further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment. Consequently, it is the Agency's expectation that for clean closure, all hazardous waste and liners will be completely removed. However, some limited quantity of

hazardous constituents could remain in environmental media provided that this residual contamination would not pose a risk to human health or the environment. As discussed in the 1987 Federal Register notice, the Agency supports the use of risk-based concentrations as acceptable clean-up goals for environmental media contaminated by releases from a regulated unit as long as the residual levels: 1) are protective of all potential exposure pathways, including the risk posed through the transfer of contaminants from one medium to another (e.g., soil to ground water); and 2) consider that ecological concerns could necessitate the need for more aggressive remediation than might be required strictly to protect human health.

The new modification to traditional clean closure (i.e., restricted-use clean closure) retains these fundamental expectations. However, in an effort to support State efforts to redevelop industrial properties and/or provide clean-up goals which are consistent with site-wide remediation, the Headquarter's memorandum allows for consideration of reasonably expected use with regard to the residual contamination that may remain in media while still achieving the clean closure standards. Consequently there may be certain situations where the assessment of risk posed by residual levels in contaminated media may be based on an exposure scenario other than residential (e.g., industrial exposure for soil, non-potable use for ground water) and the facility owner/operator may not be required to obtain a post closure permit as long as other State-imposed mechanisms exist to maintain the non-residential exposure.

For implementation of a restricted-use clean closure there must be a reasonable degree of confidence that the non-residential use will remain non-residential, and mechanisms must be established by the State to limit current and future exposure. For example, a non-residential scenario for soil in an industrial area could be imposed through institutional controls such as deed restrictions. For ground water, non-potable uses could be designated through an EPA endorsed Comprehensive State Ground Water Protection Program (CSGWPP)[1]; other EPA-endorsed state-wide classifications[2]; and/or Federal[3] ground water classification guidelines (i.e., Class I, II, or III ground waters). Whatever mechanisms are developed by the State, they must include the following provisions: 1) the area covered by the non-residential use must be clearly delineated; 2) there must be assurances that the land or water use remains non-residential, including a requirement to periodically verify actual land and/or ground water use; 3) there must be conditions to inform the local community on the exposure assumptions applied and the associated use restrictions which must be maintained; and 4) there must be procedures to alert future users to the presence of contamination and its risks.

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[1] Refer to April 4, 1997 OSWER Directive 9283.1-09 titled, "The Role of CSGWPPs in EPA Remediation Programs."

[2] Currently there are no states within Region III with EPA endorsed CSGWPPs or other EPA endorsed state-wide ground water classification. The experience of the RCRA Program in Region III is that most aquifers at RCRA facilities in Region III will probably be either a current or potential drinking water supply and will not meet the requirements to be classified as a non-potable (i.e., Class III) aquifer.

[3] Guidelines for Ground Water Classification Under the [1984] Ground Water Protection Strategy, Final Draft, "Office of Ground Water Protection," November, 1986.

At this time, it is the Region's belief that approval of restricted-use clean closure for contaminated ground water will be infrequent because of EPA's clear policies and remedial expectations that are applicable to ground water protection and the absence of any EPA-endorsed State ground water classification systems.

It is EPA's stated goal to return usable ground waters to their maximum beneficial uses, wherever practicable, within a time frame that is reasonable given the particular circumstances of the site (May 1, 1996 Advance Notice of Proposed Rulemaking, 61 FR 19448). This expectation directs program implementors to consider both current and reasonably anticipated future uses of the ground water in making remedial decisions, including clean closure decisions. EPA does not consider current use of ground water as a solely sufficient justification to identify future uses of ground water for the purposes of making a clean closure determination or other ground water remedial decisions. Ideally, ground water use designations should be based on a CSGWPP which has been endorsed by EPA and includes provisions for site-specific decision making for the RCRA clean-up programs. In the absence of such a CSGWPP, ground water use designations should be based on other state-wide classifications or designations and/or Federal ground water classification guidelines (i.e., Class I, II, or III ground waters). **Therefore, where ground water is designated as a potential source of drinking water (i.e., the aquifer is not a Class III), the contaminated ground water associated with a regulated unit would generally have to be restored to residential drinking water standards throughout the contaminant plume in order for the regulated unit to be considered clean closed. For ground water that is not designated as an existing or potential source of drinking water, a clean closure determination should be based on whether site-specific remedial objectives[4] have been achieved such that further regulatory control under RCRA Subtitle C is not necessary, including even ground water monitoring.**

Given that there are no states within Region III with an EPA-approved ground water classification system, a typical restricted-use clean closure would include a mixed exposure scenario. For example, consider a regulated unit at an active industrial site overlying an aquifer which is used or could be used as a drinking water supply in the area (i.e., the aquifer is not a Class III aquifer). If an industrial exposure scenario is appropriate[5] to establish soil clean-up levels for a site-wide corrective action, then a RCRA regulated unit undergoing clean closure at

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[4] Establishing remedial objectives for non-potable ground water should consider any surface or ground water bodies to which such non-potable ground water discharges, and any current or reasonably anticipated future uses of the non-potable ground water such as livestock watering, agricultural irrigation, industrial uses, or other purposes that might result in human or environmental receptors. Depending on the designated use of non-potable ground water, restoration throughout the plume to sustain that use may still be appropriate. For example, achieving a cleanup standard throughout contaminated ground water that is designated for agricultural purposes may still be appropriate, but the cleanup standards might not always have to be to drinking water levels.

[5] Considerations for determining when industrial clean-up levels for soil are appropriate are provided in EPA's Land Use in the CERCLA Remedy Selection Process, OSWER Directive No. 9355.7-04.

the facility would be required to remove all waste and liners from the unit, achieve the residential drinking water standards for ground water contaminated by releases from that unit, but would likely be allowed to clean-up residual soil contamination to levels consistent with an industrial exposure scenario. Of course, this scenario would only be acceptable when the industrial soil clean-up levels are also protective of human health and the environment through cross media transfer, such as leaching to ground water.

Since all States within EPA Region III already have authorized programs in place for RCRA closure, implementation of restricted-use closure will largely be at the discretion of State RCRA program managers. EPA will continue to work with the States to coordinate closure of regulated units with site-wide remediation under the corrective action program.